THE UNIVERSITY OF THE STATE OF NEW YORK

BULLETIN TO THE SCHOOLS

VOLUME 35 MARCH 1949 NUMBER 7

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THE UNIVERSITY OF THE STATE OF NEW YORK

BULLETIN TO THE SCHOOLS

Issued monthly during the school year by the State Education Department

CHARLES F. PROBES, *Editor* MILDRED HAND, *Assistant*

This bulletin is sent without charge to all schools and educational institutions of the State. To others it will be mailed postpaid for 50 cents a year, 10 cents for single copies.

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The University of the State of New York

Bulletin to the Schools

VOLUME 35 MARCH 1949 NUMBER 7

Bird, Arbor and Wild Life Days

FROM TIME IMMEMORIAL trees have provided the sinews of civilization. The literature of all languages is filled with praises for the beauty of trees — but so accustomed have we become to the warmth and nourishment that could not be ours without them that, like the air itself, they are often taken for granted.

It is only when we fear the shortage of that which trees make possible that we worry about the trees themselves. Today, in the face of growing demand, there is need to take stock of the world's limited natural resources. Conservation has become not an academic, but an important and living issue. And conservation means, among other things, trees — trees and more trees. And with trees go the wildlife and birds that help to make our forests real sanctuaries of nature.

Thus, this year, Arbor Day has more significance than usual. It is not merely a routine, annual observance. It is a day dedicated to the preservation not only of our own resources, but the resources of all peoples. In protecting and increasing our woodlands we are taking the first and the most necessary steps in conservation.

Therefore, by virtue of my office and in accordance with the law, it is my duty and pleasure to declare that Arbor and Wild Life Day are to be observed in New York State this year on April 29th, May 6th or May 13th, whichever suits best the convenience of each locality. And further, I designate April 8th as Bird Day.

Francis T. Spaulding

Commissioner of Education

This is My Sanctuary

A Nature Lover Gives a Secret for Contentment and a Recipe for Good Citizenship

E. LAURENCE PALMER
Professor of Nature and Science Education and Conservation
Cornell University

A QUARTER OF A MILE above the town of Solon, Trout brook flows over a bed of shale where the rock between two joint planes has been completely removed, leaving a deep rectangular "bath tub" hidden under willows. Fifty years ago a boy by the name of Palmer matched his wits with a 14-inch rainbow trout in that pool while his dad stood on the bank and gave advice.

Just above the waterworks in Cortland, in Otter creek, grows a huge willow that once was the home of some cedar waxwings. When the young left the nest a half-century ago, they used as one of their first perches a lancewood trout pole held by the same Palmer boy.

Near the town of Cedar Falls, Iowa, the Cedar river flows over a dam. One day, more than 30 years ago, some caddis flies laid their eggs on the rocks at the foot of the dam. A young teacher by the name of Palmer stood by, showed some Iowa farmers what was going on and pointed out to them the relationship between caddis flies and fishing, and caddis flies and hay fever.

A huge log at least five feet in diameter lies across Gibson creek near the town of Oakville, Washington. One day, 20 years ago, under that log rested an enormous trout. That day its wits were better than those of that same Palmer now grown older. The next day the trout surrendered to a new plan submitted by the same human, and his skin now rests a few feet from the typewriter on which this article is being written.

Hidden in a copse of shrubbery on a near-by golf course, is a single sassafras tree that is passed every year by thousands — but not 1 per cent of these persons even notice it or get pleasure from nibbling one of its fragrant twigs.

These are some of the spots on this earth of ours that I call my sanctuaries. I have legal ownership of only a few of them but an understanding proprietorship of all. These are the places where I have had initial experiences with nature, where so far as I myself am concerned I was a pioneer discoverer. Because of this special interest, these are the spots I would make sacrifices to preserve. The best part of this imaginary world of mine is that it has few geographical boundaries. For the most part it costs me nothing and it has taught me that any time I want to do so, I can discover a new world in any weed patch, lawn, sidewalk, wood lot or waterway on the earth.

What I learned about trout, light, temperature, water and the slipperiness of diatomaceous oozes in Trout brook in Solon a half-century ago helped me interpret what I saw decades later near the Pali on the Island of Oahu. What I learned long ago about temperatures in Otter creek I used to keep me warm in a snowbank last winter when the temperature went below zero.

We are moving toward a world ruled by generalizations, edicts, watchwords

Not Money, but Appreciation Gives Ownership to This Sanctuary

and shiboleths. We preach independence and teach dependence. I would fight for the protection of Trout brook though I have not fished in it for years. I know it can give happiness to youngsters and that it harms no one. Similarly, I have worried about what the lumbermen might have done to that brook in the state of Washington, or the engineers to that little eddy below the Iowa dam, since these are to me private little sanctuaries. True, I recognize that civilization must progress, but I feel that I have a part in defining what the progress shall be.

Progress is not only iron rails and concrete abutments, paved highways and formal gardens. In part, at least, it is preserving in your town and in mine a place where a growing human being can discover by himself how a vireo uses cobwebs to bind the parts of its nest together. It means that your children and mine shall be guaranteed a chance to lie down on a hot day in a clean waterway; or in winter to ski downhill on powder snow through a woodland and frighten a grouse from its hiding place in a snowdrift. It means that we shall be able to enjoy rationally all sports associated with wildlife.

It means also that we as teachers shall have taken time to show youngsters the beauty of the commonplace, the wealth of opportunity to learn — offered for example by a common lawn. We will have learned how to see big things in little things. It means that we and our pupils must learn to use our imaginations to help us to be happy with what we can earn by our own effort in the part of the world in which we live today. It means we shall learn to be producers, not parasites; that we shall improve, not destroy, this good earth of ours.

Nobody but myself could have given me those experiences across the continent

and in my own backyard, though a third grade teacher really did help and my college teachers made me pioneer. Are you, teacher, prepared to help your pupils along these lines? Would you want help yourself? Through these semiguided experiences, I have explored, even though it is nothing more than a step in a path across my lawn. I am building, even though it is nothing more than a few acres of brushland sanctuary that kids can explore, where they can imagine they are Robin Hood, can build dams, can wade and can get acquainted firsthand with gray squirrels, screech owls, shrews and land snails.

I can not help feeling that anything that brings men, large or small, close to the land at frequent intervals is wholesome and that it develops a substantial type of citizen. I wish every teacher would teach every child to adopt some spot in nature as his sanctuary. He does not need to own it legally, but it may mean more to him than it does to its owner, if he has learned to understand that one spot through the year in all sorts of weather. For years through the pages of the Cornell Rural School Leaflet and through Nature Magazine, I have preached this philosophy. For almost as long a time, through the radio program, "This Week in Nature," I have tried each week with real children before the microphone to show teachers how they could develop it.

Sanctuaries are no longer just government projects; they become your property and their welfare your concern. Farms and town lots are sanctuaries to their owners; but they can also be yours. Their place in a rational scheme of management of nature becomes clearer after you have listened to farmers, hunters, fishermen, scientists, artists, teachers and just ordinary folk present their views on controversial issues in the conservation field. Good citizenship becomes a real responsibility.

Teachers interested to attend a brief period of intensive training in the teaching of conservation at Cornell University this summer should apply immediately to Professor E. Laurence Palmer directly or through the local superintendent of schools. Expenses at Ithaca will be covered for those selected for this small group. The course is made possible through the cooperation of the New York State Conservation Council and other agencies.

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Acknowledgment

This Arbor and Wild Life Day number of the BULLETIN TO THE SCHOOLS was compiled with the cooperation of the New York State Museum. The editor desires to express his appreciation to Dr Carl E. Guthe, Director of the State Museum; to Alvin G. Whitney, Assistant Director, and to all who contributed articles and photographs.

A Scientist Watches the Beaver

Patient Observation Brings New Understanding of This Elusive Animal's Daily Life

LLOYD TEVIS JR.
Research Fellow
Edmund Niles Huyck Preserve

Photographs courtesy of New York State Conservation Department

A CASUAL INSPECTION of the exterior of a beaver lodge during the daylight hours does not tell what is happening within. But an observer who waits quietly will be rewarded by strange sounds. Although many of the sounds are faint, some being a barely audible sighing, the observer can be confident that every movement and muttering of the animals will be heard through the walls.

Once, seated in a chair, I spent 13 hours beside a beaver lodge in order to list the frequency of every kind of sound that occurred within throughout the day. Seven animals were crowded into the single, low chamber shut off from the outside by sticks, earth and water. The quietest period was between 10 a. m. and 3 p. m. But even then the longest interval of silence was 25 minutes.

In early summer the most piercing noise to come out of the chamber is the crying of the kits. It has a pitiful, complaining quality. When I listened to it rising and falling in intensity and volume I suspected that the babies were being tortured. The older animals, especially the yearlings and the rough, aged male, might resent newcomers in their home. I wondered if the helpless kits could survive. Later, upon learning their true character, I found that there was no basis for my fears. The kits cry not because they are the objects of maltreatment but because they have a nasty disposition. If they are restrained from stealing food from one another and from their parents and their older brothers and sisters they complain to the whole world.

The adult beavers, who are much less talkative, utter an exceedingly peculiar, faint whine so ventriloquial in character that it seems to fill the air without originating at any particular point. It is given when an animal wants to warn its companions to stay away from the food. Excluding its ventriloquial quality, I could imitate it by trying to say "o-o-o-o" with closed lips.

Other indications of life within the lodge are the sounds that a beaver makes when it scratches at the stick walls of the chamber, digs into the earthern platform, splashes about in the shallow water or feasts on bark or leaves — and the stomach rumblings and the belchings of the ones who are asleep. When an animal swims through a passageway the resulting noise is like the gurgling of hot-water pipes.

Early in the afternoon of my all-day session, the lodge shuddered from an impact which was followed by a loud splashing and bubbling and gurgling. A beaver had awakened with a start. Being in a hurry to plunge into the water it had arisen recklessly from its bed and bumped against the roof of the chamber.

A Beaver Lodge, Showing Cuttings of Cleanly Barked Aspen Poles

For a few seconds thereafter no sign indicated the intentions of the animal. Then the whirligig beetles that were clustered together on the surface of the water outside the lodge began to revolve in a bewildering confusion of metallic reflections. I knew they were agitated because the beaver, having emerged from the chamber, was swimming underwater. In another second bubbles welled up to the surface in a sparkling line, which zigzagged away from the lodge, circled around and returned. The animal did not appear. Without having poked its head above the surface of the pond, it climbed back onto the dark musty platform and snuggled into its crowded bed.

Along many of the watercourses where these large aquatic rodents live, the student of nature captures only rare and fleeting glimpses of them even though the results of their energetic labors are on every side. Residents of the country, visitors from the city and even explorers of the wilderness get most of their first-hand facts about the beaver from a study of the dams, lodges, trails, canals and felled trees rather than from the living animal itself. Largely nocturnal and, if persecuted at all, tending to be shy, the wild beaver is an elusive and mysterious creature.

Actually, though, the student who goes to the right place and watches carefully for a few hours at a time can see a surprising amount of the behavior of the undisturbed animal. There is no better place than a nature sanctuary — if it has an active beaver pond — for there, where man observes instead of destroys wildlife, the beaver loses some of its wariness.

No concealment other than the vegetation of the shoreline is required. Knowing the time of day at which to come, the student can watch beavers in a natural setting. As though he were far from the congested cities, he can see these fascinating animals do what their tribe has been

doing unobserved for ages in the great, rugged wildernesses of the North American continent. He can find out for himself how they work on their dams and lodges, how they procure food, how they awaken in the afternoon and go to bed in the morning, how they treat their own kind as well as the muskrats and other species of animals that live in their ponds, how they raise their young, and how they respond to wind, hail, rain, thunder and other meteorological disturbances.

During the summer of 1947 I had the good fortune to watch the beavers of Lincoln pond in the Edmund Niles Huyck Preserve, which is located about 30 miles southwest of Albany. Set high in the Helderberg mountains, this sanctuary incloses heavy forests of hemlock as well as old clearings that are being recaptured by shrubs and briars, the first stage in natural reforestation. One of its objectives is to conserve the wildlife and the natural beauty of the area and to increase knowledge and love of nature. The directors keenly appreciate how vital it is to our well-being as a nation that areas be set aside where wild animals and plants can thrive without molestation.

At about 7 o'clock each evening, a snort from within the lodge preceded rippling and gurgling sounds. In a few moments some 40 feet away the shaggy head and shoulders of a beaver broke water, rose a little into the air and settled back. This phenomenon, the emergence of the first beaver of the early evening, never failed to thrill me; and my excitement was shared sometimes by people from the near-by village of Rensselaerville and by visitors.

That summer the one beaver family that occupied the pond consisted of two old adults, two sleek yearlings and three small, petulant kits. On the average, the first animal out each afternoon to begin the business of the night showed itself between 6 and 7 o'clock. The earliest time was 5 p. m., while the latest was 7.25 p. m.

Upon emerging, the beaver shakes its head, after which it cruises beside the lodge in great circles. It alternates short spasms of vigorous paddling with long, relaxing glides. It limbers its muscles while it critically eyes the sheet of water and the shoreline thickets to make sure that all is well.

A Large Poplar in Process of Being Felled by Beaver

If it detects something out of the ordinary, such as a passing canoe, it strikes the pond with its tail and dives, throwing up a fountain of spray. Thereby it warns its fellows of possible danger. Their reaction depends upon their feeling of safety or lack of it. A beaver who hears the tail slap while in deep water has a careless attitude, but one who is in the shallows will head for the depths, and one who is on land will gallop to the pond with all possible haste.

In June and early July the mother of the kits emerged earlier than did the other animals. After swimming away she would return within a quarter of an hour towing a cutting of basswood or similar plant loaded with foliage. Diving when a few feet from the lodge, she would pull the cutting underwater. Then in a few seconds loud, excited, angry cries from the kits would indicate that the food had reached them.

It was not until the night of July 6th that the mother coaxed her babies into taking their first dive from the chamber of the lodge down into the water-filled passageway and up to the starlit surface of the pond. The sensation of coming out of the darkness into a new world must have been an exciting and perhaps fearful one, like birth. After they reached the surface they tried to scramble on their mother's back. They were frightened by the wide expanse of twinkling water. She had to dive and shake them off in order to teach them to shift for themselves.

A month later, when they had gained experience and confidence, they did not have to be prodded out of the lodge. Instead, nearly every day a kit was the first of the beavers to breathe the fresh air of the afternoon, and it would hurry across the pond to devour the cherry and aspen branches that the older animals had dragged to the water during the preceding night.

It was the habit of the adults to cut food in excess of immediate needs and

The Beaver's Powerful Hind Feet and Flat Tail Make Him an Expert Swimmer

after sampling a bit to leave it scattered along the shores. They worked alone. Even when the dam or lodge had to be repaired, each beaver, disregarding the efforts of its companions, acted as though it were the only caretaker of the pond and environs. But whenever one felled a tree the entire family would join in eating the bark.

Although usually the beavers were at least tolerant of their own kind, sometimes when they competed for food they became vexed and irritated. Once the old male, enraged by the persistent attempts of a yearling to peel the bark from his beached aspen log, tried to drive the latter away with fierce lunges. Failing in that, he grasped one end of the log and started to tow the food to the far shore. The yearling followed. It put both paws on the opposite end, clung there, and gnawed the bark, while the infuriated male arduously pulled the double load across the pond.

Even less frequently observed than examples of jealousy over food were scenes of mutual affection. One morning I discovered the old male and female hidden in a recess of the bank under a canopy of alders. A mist was rising off the pond, but through it I could see the two large creatures squatting in shallow water. With their paws and mouths they were caressing each other gently.

The opportunity to observe so intimate and delicate an emotion in wild animals as well as the many other facets of their undisturbed behavior re-emphasizes the value of nature sanctuaries.

Recently the need for a better understanding of man's natural environment received wide publicity through books by William Vogt and Fairfield Osborn. To understand this environment we must preserve segments of it where we can analyze its complex of interwoven, interacting factors. But there is another equally important value. It is the value of having close at hand places where we as well as the generations of the future can lose ourselves in nature; where we can gain the spiritual uplift that comes when for a while we forget human things in contemplation and study of the beauty and the mystery of the wild.

Beaver Then and Now

"There is a colony of beaver near the Adirondack hatchery, probably the only one in the State, and if this rare animal, supposed to have become extinct in New York, is to be preserved, there is urgent need for the enactment of a law to protect them at all seasons. During the past year a beaver in this colony was killed, and then it was found there was no law for their protection."

(From a report of the Forest, Fish & Game Commission, 1895.)

Probably as a result of this report, beaver were given State-wide protection for the first time the following year. Restocking began in 1904, when the State bought seven; and in 1907, through arrangement with President Theodore Roosevelt, 17 more were obtained from Yellowstone Park. The first protests on their activities — a reliable indication of happy and abundant beavers — were filed in 1911, and in 1928 came the first open season. With recurrent open seasons, the population now seems stable at about 15,000.

New York State Conservationist
December 1947

Radio Brings Conservation to Schools

The Empire State FM School of the Air Offers a New Teaching Help

FLOYD E. CARLSON
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New York State College of Forestry
Syracuse University

IN JANUARY 1948 the New York State College of Forestry at Syracuse University was asked to broadcast during the month of March four trial programs in the field of conserving natural resources, over the recently organized network of FM stations, which included Rochester, Hornell, Corning, Syracuse, Utica and Cortland. The new network had been formed to provide radio programs especially designed for schoolroom use. This was obviously a good way to put conservation teaching directly into the schoolroom.

A number of ideas, both as to program format and subjects to be covered, were discussed with teachers. We decided to use the question and answer technic with a small panel of school children, and to deal with subjects somewhat familiar to the pupils on the panel as well as to those listening in the schoolrooms. The series was to be called "Woodland Wisdom."

The first program, "The Woods and the Wind," was broadcast March 3d. Two sixth grade boys were on the panel. We started by putting on magic moccasins and heading for a woods trail. We found wind blowing, felt it less in the woods, saw the wind sweeping snow off the fields, and realized that the woods helped the snow water to percolate into the forest soil and so feed the streams gradually and for a longer time, thus helping to avoid flood waters.

We talked about the wind being a giant tester of trees, bringing the unfirm trees to earth. We saw how seeds were scattered by the winds, how the branches of trees which were too crowded whipped together and damaged the tree tops.

The following Wednesday we added two girls to the panel and in our imagination set forth, with rubbers, because we discussed "The Woods and the Rain."

In the rain, on the way to the woods, we stopped at a bridge to study the flow of water. We noticed a fork upstream in the creek. The right fork had clear water in it, the left fork had muddy water. From deductions we decided to follow the right fork if we were going to get into the woods.

We noticed the raindrops now came down as mist in the woods; while walking out in the fields, we saw the raindrops coming down like little hammers beating away at the soil, to loosen and send it down the slopes.

The following Wednesday we added another boy and girl to the panel, and this time, in good weather, we discussed "The Woods and the Sunshine."

During this program we observed the shade trees along the street on our way to the woods, their greater branching due to wide spacing and abundant light. In contrast, we noted the taller trunks and restricted branching of trees in the woods. We discovered that after the leaves came out in the spring the woods, making best

use of the sunshine, have mostly shadows on the forest floor with the sunlight taken up mainly by the leaves.

On the fourth program, "The Woods and the Forest Fire," we talked about "the blackhearted demon that takes fiendish delight in changing a beautiful forest growth into a charred cemetery of trees." We now had three boys and three girls on the panel and that number was considered adequate.

This program concluded with two imaginary woods pictures of fishermen so eager to get to the stream early in the morning that they left their camp before putting out the campfire. There followed another picture of the fishermen returning home, kicking their fire apart and "guessing it was going to rain" without knowing for sure that the scattered embers were really safe to leave.

On the broadcast it was pointed out that there was enough heat in a cast-off cigaret to release the fire demon.

Following this trial run of four broadcasts a conference was called with several teachers who had used the programs, to get their appraisal. The over-all comment was encouraging. Suggestions to use a story, to rely less on questioning of the pupils and to make a strong appeal to the imagination came out of the discussion. More especially, the teachers said they would like to have notice of the programs in their hands before broadcast time, with a general statement about the subject expected to be covered. It could likewise list ideas for follow-up discussion in the classroom. Out of these suggestions came the Hints to Teachers.

Reports from Rochester and other schools indicated that there was a favora-

Photograph by Robert J. Arnold

The "Woodland Wisdom" Panel Discusses the Earthworm

ble sentiment for the conservation series to continue in the fall. It was decided the college was to continue with its "Woodland Wisdom" series in October and that some other agency would take over the program on conservation for the months of November and December.

At the annual meeting of the Empire State FM School of the Air in June 1948, it was announced that the Rural Radio Network would broadcast the School of the Air programs on its eight stations, thus increasing the outlet to 14 stations to reach almost every section of New York State.

Furthermore, assurance came from the Rural Radio Network that it would be responsible for coordinating a program to follow the October series, to be called "Conservation of our Natural Resources."

As the fall series developed, Dr E. Laurence Palmer, professor of nature and science education at Cornell University, cooperated in a program on "Friends in Need," which emphasized the winter food requirements for birds and other wildlife and was supplemented with Suggestions for Teachers, listing activities, poems and books.

The New York State College of Forestry programs on the Empire State FM School of the Air continued through four Mondays in October; and in 1949, through four Mondays in January and three in April.

In Hints to Teachers, made available through the boards of education where FM receivers in schools made listening possible, we attempted to bring more vitality to the radio program. We suggested specific things for our listeners to do to prepare for the broadcast.

In one instance we asked the teachers, through Hints to Teachers, to divide the class into teams of five. Pupils in the team were assigned to get an eight-inch flowerpot, a pot saucer, soil, dry leaves and a dozen lively earthworms. With one boy or girl assigned to keeping the leaves moist, the pupils were asked to observe the results. In a few days pupils would see how the earthworms pull leaves into the soil and so add to the fertility of the soil.

To those grade schools that have access to FM receivers but do not have Hints to Teachers from their boards of education the College of Forestry will be glad to send copies well in advance of the program.

An inquiry to the board of education in Rochester revealed that approximately 5600 grade school pupils were listening to the conservation series in more than 180 classrooms. In Syracuse, it is estimated that a majority of the fourth, fifth and sixth grades are listening at various times during the week to the several programs offered on the Empire State FM School of the Air. Requests for the Hints to Teachers indicate that all schools of elementary instruction are interested — private, parochial and public schools.

With the original six stations plus eight of the Rural Radio Network, three additional FM stations have been added at Oswego, Buffalo and Albany, making a network of 17 stations reaching from Buffalo to New York to Ogdensburg on the St Lawrence.

The network has already demonstrated a democratic approach to providing educational resources not available within any single community. The programs are intended to supplement the work of the teacher and, in many instances, to open new vistas hitherto closed to both the teacher and the pupil.

For detailed information about the FM School of the Air, write Eugene S. Foster, Executive Secretary, Radio Center, Syracuse University, Syracuse, New York.

Medicinal Plant Lore of the Iroquois

Chauncey Johnny John and James Crow Instruct He-lost-a-Bet in the Use of Native Plants

WILLIAM N. FENTON
Ethnologist
Bureau of American Ethnology
Smithsonian Institution

Photographs by the author

WHEN IT COMES to Indians, school children have an insatiable curiosity. The things they want to know about Indian uses of plants may be summarized in six questions: What plants did the Iroquois Indians of New York State know and use as medicines? How much did they know about the native plants? What did they use the plants for? How did they prepare the plants as medicines? What do the Indians know about the plants today? What can we learn from them?

I had to learn about the plants while collecting them in the field with old Iroquois herbalists who knew only the Indian names for most species that they sought. In several seasons of collecting among the Senecas of western New York, the Mohawks of northern New York and Quebec, and the Six Nations of Ontario, a herbarium of Indian medicines soon numbered several hundred items.

One of the surest ways to gain an Indian's confidence is to get him talking about plants. He may freeze up if asked directly what he knows about the old medicines, but he is more likely to pluck some plant growing at hand, for example toad rush (*Juncus bufonis*), and relate that it grows everywhere along the village paths and that because it springs up when stepped on, the Senecas call it oge'o'dja'geon'; trainers of athletes make a decoction of the whole plant and give it as an emetic to runners and lacrosse players who drink all they can for four mornings on rising.

Collecting the plants in the field is the only sure way for both the Indian herbalist and the student to be certain that they are both discussing the same plant. When training an apprentice, the herbalist prefers to go into the bush where the plants live, armed with a grub hoe and carrying a splint basket or sack. Sometimes my Indian friends and I worked from the color plates of the State Museum book Wild Flowers of New York; but after 1933 we discussed the plants and medicines with Professor William Alexander of the Buffalo Museum of Natural Sciences, who had already transplanted the principal herbs into an Indian garden.

In the course of their long history, the Iroquois of New York have probably experimented with the total flora of the region. Since the coming of the white man, many plants have been introduced from Europe and the Indians undoubtedly acquired some of their present lore from the colonists. The colonists in turn took over remedies from the Indians, and the United States Dispensatory still carries a respectable list of Indian medicinals, of which several came directly from the Iroquois.

Probably no Iroquois ever mastered the total flora of his habitat, but one of my informants, Chauncey Johnny John of Allegany, in the course of our collecting trips, took or recognized about one-third

of the nearly 800 species listed in the State Museum handbook: Flora of the Allegany State Park Region; and we came on several species that had not been recorded. He sometimes confused species, and his native taxonomy enabled him to relate as "sisters" distinct species, but he occasionally made distinctions not recognized by botanists but which he could demonstrate. For example, he distinguished between the roots of *Eupatorium purpureum* and *E. maculatum*, two species of joe-pye weed, for it makes a world of difference to Seneca herbalists in selecting the ingredients for pneumonia and kidney medicine that they take the fibrous roots of *E. maculatum*. A complete list of all species, common names, Indian names and uses, tabulated from our systematic file of Iroquois medicines far exceeds the length of this article.

Indian plant names often point to some characteristic feature or property of flower, stem or root; or the name suggests a habitat, the preference of some animal for it or some obvious economic use. Some plants are named for a resemblance to more familiar plants, and still others are compared by form and odor to some other object in nature. "Smells like a skunk" is obviously skunk cabbage; but "smells like a log puller (horse)" for black cohosh is somewhat more subtle. The black stalk of maidenhair fern is appropriately "black shins" in both Seneca and Mohawk. "Whippoor-will's moccasin" for the several species of lady's-slipper, and "turtle's leggings" for pitcher plant show real poetic fancy. Of a more sinister quality, suggesting witchcraft, are "owl's arrow" for sensitive fern and "rattlesnake arrow" for purple-fringed orchis. "Nose-on-either-end" or "double-nose," which turned out to be the root of yellow leafcup, (*Polymnia uvedelia*) was the subject of our longest quest, taking us to Cattaraugus and old James Crow.

Chauncey Johnny John Takes Bloodroot at Onoville

For seven years I had heard about degagondon'dahgon, "nose-at-both-ends." It did not grow at Allegany, but the Redeyes and other Seneca families where I boarded got it from Cattaraugus to use as a fumigant for ghosts, against returning souls, and on having a nightmare. They would waken up in the night and burn it like punk. For a long time I carried a piece of the root, but only to confound botanists. All Indians recognized it for what it was, but the botanists had to have a plant. So on July 11, 1940, Chauncey and I set out to visit his old friend James Crow at Newtown near Lawtons, N. Y., where Chauncey had grown up. Old Sanón'gais, "long horns" greeted us, and after hearing our request, led us to where the plant grows along the south rim of Cattaraugus creek, just opposite the Thomas Indian School. Old Jim went armed with a mattock for digging out the root, a sack for carrying it, and he had homegrown Indian tobacco (*Nicotiana rustica*) for the invocation.

As we descended the terrace along the creek, to reach the plant station, Jim pointed out the extent of the patch. There stood "double-nose" high and not yet in flower, covering half an acre. Bareheaded, the Old Seneca seated himself beside the first plant and invoked its help by placing the sacred tobacco in the soil next to the root. It is a Seneca theory of conservation, at least, to offer tobacco to the first plant of the species encountered and go on to take the second. The first plant stands for the whole species.

He prayed: "So surely all of you share this tobacco right here where you inhabit the whole earth where you were created expressly to assist the people so far as is possible. Therefore help them to be strong, O Creator. So now strengthen them (the plants); you created the genuine tobacco which we shall use here where all of you dwell, whose name is Double-nose.

"Don't then withhold your help even from the one here whose name is He-lost-a-bet (the author's Indian name). Don't in the least restrain any of your power. And don't think that he is merely a white man, because he also has an Indian name, He-lost-a-bet, and it happens that he too esteems a powerful source of help all of you who are standing here, Double-nose, as you are called. That is all."

Now we were free to dig the roots. Jim kept part for himself, and Chauncey and I took a share back to Allegany — I for the botanists, and he to trade to his neighbors.

That is how Iroquois herbalists collect plants. They regard plants as part of the earth's population, released there by the Creator to help the people. The tobacco invocation appeals to the Creator to strengthen the plants and to the plants to lend their strength to help the person who is named. Since it was apparent that I was not a proper Indian, some explanation was necessary — that I had been adopted and that I showed proper respect for the plant world.

Custom and individual whim probably determine the use of medicinal plants by the Indians today. Only for the better known plants are the uses and names standardized, but for the greater number the uses differ from herbalist to herbalist.

The diuretic properties of *Equisetum* are almost as well known as its use for scouring pots. All Indians and most white people have heard that the needles of evergreens and the bark of cherry are expectorants. Likewise there is fair consistency among the plants used in childbirth and for women's disorders. The commoner emetics and physics are discoverable by experiment or sad experience. Water hemlock (*Cicuta maculata*), the fatal root of Iroquois suicides, con-

"So surely all of you share this tobacco . . . whose name is Double-nose"

tinues to cause accidental deaths, but it also makes an excellent poultice for sprains; and generally Indians know that the root of May apple (*Podophyllum peltatum*) is a violent physic.

Sympathetic magic enters into the preparation of formulas. Barks are scraped upward for emetics; downward for a purgative. Related to this is the doctrine of signatures, or some correspondence between the external shape of the plant and symptoms of the disease, which leads herbalists to favor yellow-flowered or yellow-rooted plants for bile and jaundice; sycamore bark for scabs; bloodroot for wounds; and the secondary rooting of black raspberry for love magic. Compounding the formulas is another device that rests partly on association of effective ingredients, partly on sympathetic magic and signatures, and partly on the magic of good numbers — 4, 10 and 20.

Dogwood Bark Is Scraped Upward for an Emetic

Chauncey Johnny John's formula for rheumatism illustrates how simples are compounded and prepared. In 1938 we photographed the old method of boiling herbs. He had laid out the ingredients prior to my arrival, being careful to preserve whole specimens of the plants, as well as the roots. There was (1) spotted joe-pye weed (*Eupatorium maculatum*) which he called gawen'stowa', "foam" (also beer), but others call it gasennowa', "oil breaks out" when one breaks the root or boils it; (2) brake (*Pteris aquilina*) e'nen'da'; (3) spikenard (*Aralia racemosa*) djowon'sisgo'wa, "giant stalk"; and (4) yellow wild indigo (*Baptisia tinctoria*) which he called by the regular name of the first, but which others call variously onda'yo'ya'kta', "berry throwing" or gadjitgwe'kta', "it draws bile."

Having collected the plants and roots, he takes the tendrils of one whole root of the first, a ten-inch length of the second root and doubles it four times, tying it; then a six-inch piece of the third is split and cut into two-inch lengths and bundled, and a ten-inch length of the last is bent four times and tied.

Herbs were formerly boiled out of doors in an iron kettle hung from a crossbar placed in two forked poles. The posts were of black cherry, the crossbar of soft maple, and the pothook of water beech, so devised that it could be adjusted to height. The cast iron kettle came down from trade. This rig was all set up when I got there, and it moved Chauncey to dance around the fire singing a chant from the medicine shows: "onegasee danongwa'tshă: fresh medicine."

All the roots were put in the kettle and the kettle was filled with water, about a gallon. "Boil until the water goes down a little. It will be strong."

The rheumatic patient is seated and the whole kettle of steaming medicine is placed between his legs. "Cover the patient with a blanket or old bear rug. He must sweat well. When all of the sweat goes off, put his feet in the medicine and bathe his legs and joints as hot as possible. Rub well and retire."

We thus have a fair sample of what Indians know of New York State plants today. Even they can no longer depend on the herbalist to cure their aches and pains, but much self-medication still goes on side by side with regular attendance by licensed physicians. Some of their medicine has merit, and it does work cures even when suggestion is the sole ingredient having therapeutic power.

Aside from the obvious historical value of such investigations as the study which I have sketched, experimental pharmacologists are always on the search for new or different uses of well-known drugs. Although the Iroquois have never been able to supply the demands of drug companies for certain ingredients, notably cherry bark, ginseng, goldenseal and cohosh, it is always possible that their formulas may hold the key to some important medical discovery.

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Wildlife in the Shawangunks

The Mohonk Preserve Offers Abundant Opportunity to the Naturalist

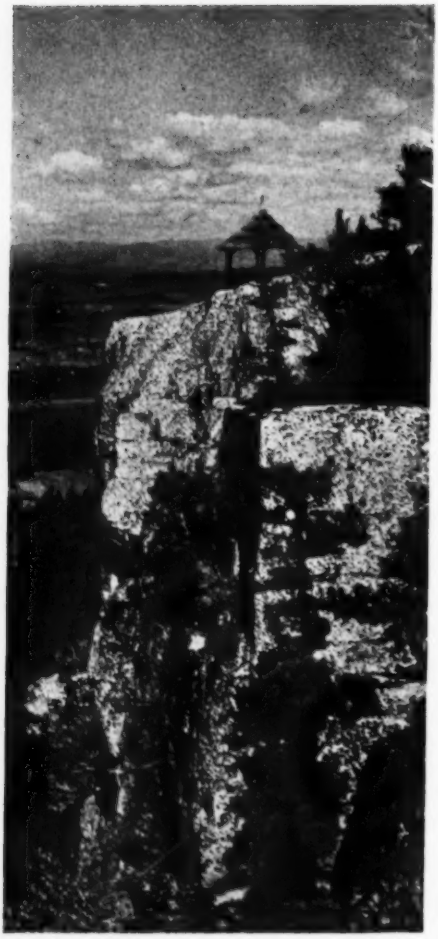
RUTH H. SMILEY
Specialist in Plant Ecology

Photographs by Daniel Smiley jr

APPROXIMATELY 90 miles from New York City in the heart of the Shawangunk mountains south of the Catskills is a 7500-acre wildlife preserve. The area is known as Mohonk and is named after the lake, situated at an altitude of 1250 feet. In Indian language it means "Lake of the Sky."

The location was first visited by Alfred H. Smiley in 1869 and the same year his brother, Albert K. Smiley, purchased the first portion of land on which the Mohonk Mountain House now stands. The original 300 acres have been increased gradually to develop the present sanctuary. The property still remains in the Smiley family, who adhere to the traditions of its founders in conserving and developing its natural beauties and resources.

The lake is of glacial origin cut deep in the rocky mountain and flanked on one side by tall cliffs rising from the water. The surrounding ledges are composed of Shawangunk grit, a very hard conglomerate stone which is characteristically covered with a flourishing growth of lichen plants. This conglomerate, because of its extreme hardness of texture, has been utilized in the production of millstones. In traveling over the wood roads and trails one may find the remains of old millstone quarries, relics of an in-



Conglomerate Cliffs with Pitch Pines Clinging to the Crevices

dustry that flourished more than 50 years ago. Countless millstones have been hewn from the ledges to be used locally in grain mills or to be shipped to faraway places.

The steeper cliffs have been sought out and scaled by some of the foremost mountain climbers in the country. The geologist, although not tempted to such strenuous exertions, finds many things to whet his interest in this area. In addition to interesting rock formations and caves formed from the covered crevices, there are many evidences of the glacial period. These include scratches on the surface of the quartz conglomerate rock, so well fitted for preserving these "etchings," and also many erratic boulders. The sharp cliffs of the conglomerate ridges, overlying the softer Hudson River shale, provides an excellent example of differential erosion.

Within the reserve boundaries one may find many different ecological plant groups, which afford the naturalist a marvelous opportunity for study and comparison. There is the unusual rhododendron swamp area with its choice association of ground plants including trillium, bunchberry, marsh marigold and fresh green cushions of sphagnum moss carpeting the dark, wet earth. In direct contrast to this lush growth is the juniper hillside. Here the dry, stony soil, unfavorable to many plants, results in open spaces that display to advantage the sentinel, columnar red cedars. Aged hemlocks with their dense evergreen foliage make the hemlock ravine communities delightfully cool places in summer. They shelter such small treasures as the partridgeberry and fringed polygala, and make a perfect setting for the fern-covered rocks and ledges.

The upper reaches of the area, where Mohonk lake and house are situated, comprise a typical rugged pitch pine-chestnut oak association. Characteristic of this type of plant community are the picturesque wind-swept pines holding tenaciously to the scanty soil between the lichen-encrusted crags. Acid-loving plants such as mountain laurel and huckleberries thrive under these conditions. One has only to walk in early spring over paths heavily fragrant with

the odor of luxuriant trailing arbutus to know that conservation is practised here.

Without going into further detail it may suffice to mention that there are approximately nine different and distinct types of plant communities to be found within the boundaries of Mohonk, each with its typical flora.

Both cultivated and wild plants have been encouraged and planted on the property. The development of the Mohonk gardens, largely on rock formation, began more than 50 years ago when Albert Smiley visualized acres of flowers blooming along the rugged ledges. It was not only this vision but hard work which tamed 20 acres of wilderness into bloom. Practically all the original soil for these gardens was brought by horse and wagon from a mile or more away.

To quote from "The Story of Mohonk," in 1911: "There are 6000 rose bushes of the choicest kinds, 5000 peonies, 4000 phlox, 8000 bedding plants and one of the largest collections of herbaceous perennials and shrubs in the country." Since that time additions and changes have been made in the gardens with the importation of new rose varieties and many new trees and shrubs. Today visitors benefit from the foresight of the founders who planted trees which have now become handsome full-grown specimens. There are particularly fine examples of weeping, cut-leaf and copper beech, as well as cut-leaf linden.

The extensive gardens are not only enjoyed for their beauty but they have afforded an excellent test garden for the area, showing which plants will thrive well in this location. It is always with amazement that gardeners find healthy

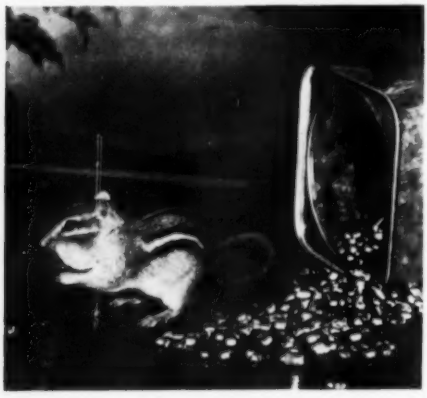
Mountain Laurel in the Shawangunks

little boxwood plants flourishing in this locale and a heavily flowering bower actinidia vine reaching to the top of a three-story building.

Every year in the fall the lake is stocked with rainbow trout. Pickerel, bass and sunfish are fairly common, too. A good-sized portion of territory on the upper part of the mountain is kept as a wildlife refuge. Deer, foxes, raccoons, rabbits, ruffed grouse and many species of smaller birds are abundant in the sanctuary.

Large rectangular holes in the decaying trees indicate to the naturalist the presence of the handsome pileated woodpecker. Observers who study the different areas from the base of the mountain to its higher points find bird species, during the nesting season, which are representative of several different faunal zones. There are several summer residents whose principal range is farther north, to be found in the damp, cool, hemlock-shaded ravines on the north and west slopes of the Shawangunks.

Among the mammals there is also a variety of forms, ranging from opossums to porcupines, from the now rare lynx to the small and rare *Sorex dispar*, or hairy-tailed shrew. There are also many deer. One of the particularly interesting mammals that is rather numerous at Mohonk and whose range is generally understood to be rather limited, is the interesting furry Allegheny cave rat, eastern relative of the western pack rat. Foxes, both gray and red, are abundant, as well as the rabbits and mice on which they prey. One of the characteristic rodents is the striped chipmunk, and those living near the Mountain House frequently become so fearless that they will eat nuts from one's hand.



A Wise Little Chipmunk Comes Visiting

With the melting snow in early spring, the botanist is out seeking the many flowers. Trailing arbutus does not wait for all the snow to disappear but bursts into bloom in the protected pockets between the ledges. With the approach of warm weather come, in rapid succession, the hepaticas, red and painted trillium, many early violets and the rue and wood anemone. One of the favorite haunts of the botanist in late May is a spot along the eastern slope of the mountain. Here the conditions of the typical oak-woods association invite quantities of yellow lady's-slippers and showy orchis to grow in profusion among the fresh green of the rattlesnake fern. This place is canopied over with white flowering dogwood.

Though the ferns as a group lack attractive flowers, one is ever conscious of their fragile beauty in the woods. More than 38 different species have been found. Some grow in abundance, as for example the Christmas, the polypody and the osmunda ferns. Others, like the walking-leaf fern and the mountain spleenwort, choose to grow in more inaccessible places and only after ardent seeking is the botanist rewarded by finding them in their haunts.

Reddening tupelos, sassafras and maples herald the arrival of autumn. On the crags, here and there, yellow patches ap-

pear where groups of birches hold tenaciously to the soil. The woodland flora is soon aflame. At this season it is relatively simple to identify the trees and shrubs by their color. The ash and maple-leaved viburnum don their characteristic purplish hue while some varieties of maple and dogwood are brilliant red. As the days shorten and fall comes in earnest, the oaks are caught up in the pageant and add their display of russets and browns. And winter, in turn, lends added enchantment to the places we knew in summer!

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Focusing on Nature

Teacher's Camera and Color Slides Can Bring the Out-of-Doors World into the Classroom

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Associate Professor of Visual Education
New York University

WE TALK a great deal about "visual instruction" these days. I am a staunch advocate of the use of visual materials as teaching aids because I myself am an "eye learner," and realize from personal experience how much of what I know is the result of having seen persons, places, objects and pictures. Some of the visual experiences have been firsthand: I have actually seen real objects and places. Others have been the result of looking at and studying various types of pictures, from book illustrations to motion pictures.

The pictures that have been of greatest value are those taken with my own camera. This is not to imply by any means that my pictures are works of art, masterpieces of photographic excellence. No indeed, many of them would never reach a judge's stand! Their value is a twofold one: first, they are teaching aids that serve to illustrate particular subject areas; second, they are training aids that focus my own vision on the world in which I live. For these two reasons I should like to recommend photographs and miniature slides as visual aids for the teaching of any subject and as being of especial importance in teaching nature study, social studies and biology.

In all these subject areas, much of what the student learns is intended to help him gain the skill of recognition — recognition of different types of leaves, flowers, trees, animals, birds; recognition of basic similarities between peoples; recognition of various forms of living things and inanimate objects.

It is relatively easy to carry out this process of learning to recognize things if one has the object always at hand or at least within easy reach. But how can one remember exactly what the leaves of the maple tree look like when autumn is changing their colors from green to crimson, if January sleet has buried every

leaf? The answer is, put a color lantern slide into a projector, flash the pictorial representation on a screen and bring the desired picture to life within the walls of your classroom without regard to the season or the weather conditions outside the walls.

Of course the hand-colored, standard lantern slide will accomplish this for you. I have no quarrel whatsoever with these excellent visual aids. They enable a teacher to bring a host of valuable pictorial materials before the eyes of his pupils. I strongly recommend the use of this type of lantern slide.

But I recommend also that we give more attention to the 2-inch by 2-inch slide, photographed in natural color, with the aid of a 35-mm camera, by the teacher himself, by the pupils or by the pupils' parents. Such slides take on added teaching value because of the personal element involved. When pupils know that the slides they are seeing were photographed by a teacher or, better still, by a fellow pupil and his father, the veracity of the picture shown is heightened in their minds. It becomes unquestioned evidence and is accepted almost as " realia " or actuality.

The frequently forgotten value of these slides, however, lies in the almost unrecognized learning that takes place while the photographer is getting ready to snap the actual picture. Before clicking the shutter release there is research to be carried out: Is the specimen exactly the one to be shown? Is the setting or background the proper one? Should other objects or details be included to give a true picture? Do the colors to be photographed represent or show the object as it actually is under specific time or seasonal limitations etc.? In learning to think of these and many other details that enter into the making of a photographic slide, pupils can be trained to use their eyes and minds to see and then to coordinate what they actually see with what they think should be shown in the photograph.

Much of what I have indicated also applies to the motion picture made for teaching purposes. The motion picture, however, as its very name implies, enables one to show people and objects as they are in action, in motion. I am here concerned with the type of picture that can be projected in such a way that it remains on the screen for the viewer to examine at length and in detail. This is the special function of the slide as a type of visual aid. Moreover motion pictures are more costly to make, a factor not lightly to be overlooked by the average schoolteacher. The motion picture requires more costly equipment, greater attention to titling, sequences and other production details. This is not intended in any way to belittle the teaching value of the motion picture but rather to call attention to the miniature, photographic lantern slide as a more generally available type of aid to be made by the average teacher and pupil.

Certainly light and shadow could be added to many a nature study lesson if it were enriched by the showing of a set of pupil-taken slides illustrating the progression of the seasons, or a set showing familiar trees (or birds or animals or stones or insects etc.) we should be able to recognize on our next nature walk.

The possibilities for subject matter are unlimited. And the physical equipment needed is only a camera that will accommodate what is known as 35-mm color film. It comes in rolls of 20 or 36 exposures. For outdoor work use the daylight-type film, for indoor use the type designed for indoor lighting conditions. Many photographers insist upon an exposure meter but there are standard pocket charts that usually give the aver-

From All the Children, *courtesy of Board of Education of New York City*

Study and Plan Precede the Click of the Shutter

age amateur such directions as he needs to regulate the speed at which he photographs and the correct lens opening. Developing and processing are taken care of by the particular company whose film you use, and the result is a 2-inch by 2-inch slide, cardboard-mounted and ready for projection. There are several simple pamphlets available at any photographic store that give complete directions for making these photographic teaching aids.

I have always found that when I introduced my own slides into any lesson or lecture there was an immediate heightening of interest on the part of my audience, whatever its grade or age level. One slide in particular is priceless to me. It shows a snow-capped peak in the Canadian Rockies, reflected in a near-by river. The reflection-picture is perfect, and it never fails to get a lively discussion started.

First the audience is shown the picture in its true position, mountain at top, reflected image at lower portion. They are then asked if they are perfectly certain the picture is being shown correctly, and after a few minutes of examination to fix the picture clearly in their minds, they are asked to close their eyes while the picture is reversed. Of course, when eyes are opened and the now upside-down picture is viewed, everyone starts to explain how he knows the picture is incorrectly shown. We discuss the fact that a reflection can not be clearer than the original; we discuss the effect of wind blowing over water and causing ripples that disturb the reflection; we discuss countless different points. One fourth grader was so intensely wrapped up in his discussion he practically put his head through the screen in an attempt to demonstrate how motion ripples water! And then he turned to me and said, "Gosh, did you really see all that ice in the *summer* time?" And believed me when I answered yes, because there was

the picture to prove it! He was a modern lad and believed in visual evidence.

We should be able to match this incident with many more. Our pupils should be provided with cameras and given an opportunity to make pictures, many of which will be brought into the classroom for subsequent study and discussion. In this way nature (as we commonly think of it as referring to the out-of-doors) will move into the classroom; the world itself will be brought into the classroom for group study and discussion. And if the world thus moves into the classroom, then the pupils of that classroom will find learning to live in that world an easier, pleasanter, more normal process.

Why not get a camera, a roll of daylight-type color film, and take your class on a "focusing on nature" field trip!

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Conservation in Your Own Community

FRANCES HORAK IRVING
President
Rockland Audubon Society

THE ROCKLAND AUDUBON SOCIETY, a branch of the National Audubon Society, was organized May 24, 1947, and includes all Rockland county in its territory. Its purpose is to study wild birds and other animals, plants, soil and water, with particular attention to their interdependence; to protect these basic natural resources; to participate in local, state and national conservation projects; to promote such educational, legislative and other activities as will further these objectives.

With this purpose in mind, committees were set up to take care of a program of field trips, publications, publicity, exhibits, Audubon Junior Clubs, nature courses for leaders of youth groups and lectures with wildlife motion pictures.

This society considers that one of its most important functions is that of education, which is accomplished through talks, slides, films, exhibits, field trips and a nature column in the Rockland County Journal News, the only daily newspaper in the county.

Although the Rockland Audubon Society is primarily an organization for adults, it is seriously interested in fostering in children an understanding of wildlife, the balance of nature and the wise use of our natural resources. This is being done through the promotion of Audubon Junior Clubs. The ideal place to organize such clubs is in the schools, because teachers are trained in leadership and understand how to work with children. Besides, more children will be reached through Audubon Junior Clubs in the grade schools than can be reached through independent Audubon Junior groups.

It is very simple to form an Audubon Junior Club in your school. Each club has an adult adviser, who in this case would be the teacher. Club dues are 15 cents a member for the school year. A club may enrol at any time during the year. The adviser should write to the National Audubon Society, 1000 Fifth avenue, New York 28, N. Y., for an Audubon Junior Club application form.

As soon as the filled-in registration form and dues are received by the National Audubon Society, the adviser will be sent a complete packet of material which includes an Audubon Teacher's Guide. This source book contains excellent information on such subjects as conservation; soil and how wildlife depends upon it; water — the lifeblood of the earth; swamps, marshes, grasslands, forests; wild birds, migration, bird feeding, building birdhouses; balance in nature; suggestions for club meetings, and things to discover and do during each season of the year. This guide also contains a bibliography of books and pamphlets on various nature subjects. In the packet will be a membership button for each member and a set of six bird leaflets for each member. In each leaflet there will be a colored picture and an outline drawing of the bird.

Every club receives Audubon Junior News, the club newspaper published four times each school year.

Teachers who have had experience with Audubon Junior Club work in their schools are enthusiastic about it because of the ease with which it can be correlated with other school subjects such as composition, reading, geography, art and mathematics. In our community of 30 families there are three Audubon Junior Clubs. The children range in age from five and one-half to 11 years and are divided into club groups according to age. They learned to build birdhouses and bird feeding stations. They made nature signs, which they put up along a nature trail laid out on community property.

Although they enjoy all the club activities they seem to like the many field trips best of all. They go to the lakes to see the ducks and loons; to the Hudson river to see grebes, ducks, eagles and gulls; on a canoe trip along the marshy Hackensack river to see the egrets, bitterns, various species of herons, rails, marsh wrens etc. They climb Hook mountain to watch the hawks. They roam the countryside to see the wildflowers and other plants. They make terrariums in their study of plant life and have "underwater zoos" to study aquatic insects. They learn to know the local trees and shrubs. They like to find tracks in the snow and identify them. They acquire a knowledge of the different habitats and what is meant by the balance of nature.

To bridge the gap between the time a child feels he has outgrown the Audubon Junior Club level and the time he becomes an adult member of the Rockland Audubon Society, a junior membership in the adult organization is provided.

Because the Rockland Audubon Society has had an increasing demand for more help for the youth groups, a nature course is being offered to all adults who work with youth groups in the county. The local councils of Girl and Boy Scouts and 4-H Clubs promote registration in this course as part of their training program. This course meets on Saturday mornings for six weeks and attendance at five meetings is required for a certificate.

Our newspaper nature column, called "Woods and Fields of Rockland County," keeps the readers informed as to the birds that can be seen during each season and indicates in what type of habitat they may be found. There are articles on the local hawks and owls and how they benefit mankind; timely articles on deer, beaver, tent caterpillars, wildflowers, snakes, insects, migration, feeding birds, what to do for orphaned or injured birds, disadvantages of burning-off a grass or weed patch and the wonders of our local marsh. Readers are invited to send in questions and these are answered in the column. This column is widely read, not only in Rockland county but in many other counties in New York State.

The society publishes a quarterly called Rockland Audubon Observer, which is sent to all members, to the libraries in the county and to other interested groups.

We are working on a series of nature publications. Three booklets in this series have already been published. Bird Houses and Plantings To Attract Birds by Frances H. Irving was the first and the supply of this bulletin has been exhausted. It will be enlarged and reprinted during the coming year. The second bulletin is Flowers That Bloom in the Spring in Rockland County by John M. Price. The third booklet is The Birds of Rockland County by Robert F. Deed.

From time to time the society arranges to bring nationally known lecturers and wildlife photographers to the county. These meetings and many of our field trips are open to the general public.

As one who works with Audubon Junior groups, I urge all grade school teachers to organize Audubon Junior Clubs. As a lover of nature, I urge others who have the same interest to band together as a local Audubon Society.

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Wild Neighbors — Good Neighbors

Life with Mice, Skunks, Cicadas and Birds Has Its Charms

MARION S. KEITH
Berkshire Industrial Farm
Canaan, New York

THE FIRST NIGHT I slept outdoors, I was painfully positive that every crawling and night-prowling creature for miles around would make our tent his Mecca and try to enter during the night. To my relieved surprise, nothing tried to force an entrance — neither that night nor the next nor the next — so that within a week I relaxed, with the realization that neighbors of the wild, unlike some humans, pretty well mind their own business. I have been wakened by bears snuffing the tent wall beside which I lay, by deer snorting close to the doorway, and by skunks visiting our larder under the kitchen fly, but in the many years since that first wakeful night no uninvited guest has ever entered our tent to disturb my slumbers. That is, unless you count the dainty little white-footed deer mouse that made her nest in a suitcase one night; but she was so quiet we didn't know she was there until later.

We had discovered her the day before in a carton of waste paper in the outdoor kitchen where, from small bits of paper, she had made a nest for her two young. In order to observe these new-found neighbors more closely, we spent the evening building a cage but decided to

wait until morning to move the family. When morning came, however, the waste paper nest was empty. Some hours later my husband lifted the lid of a suitcase and found the family comfortably settled in a soft nest made of chewed socks.

The transfer to the cage finally accomplished, they became our neighbors for the rest of our stay at that campsite. We never tired of watching the active little creatures with their big eyes, neat, furry coats and long, delicate whiskers. In fact, we are always pleased, on making camp, to lift an old board that has been lying on the ground and find a family of deer mice living underneath. They make very interesting wild neighbors.

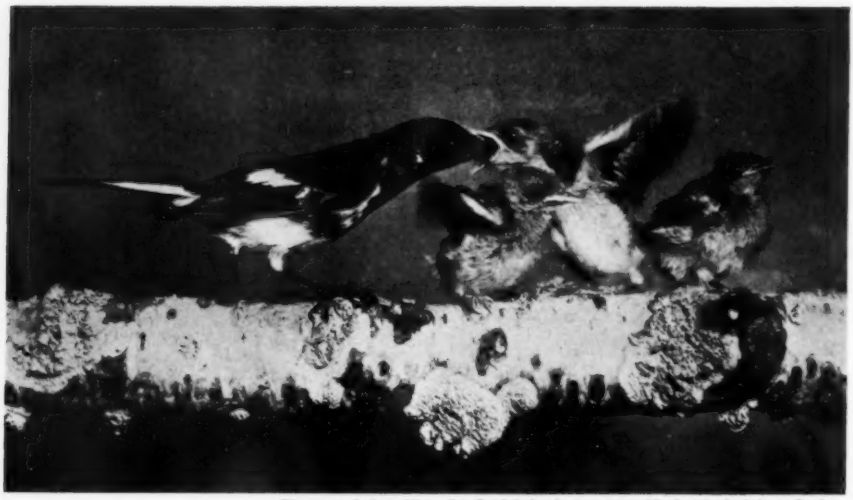
If a human neighbor yodeled loudly outside your window soon after dawn every morning, he would probably not be welcome. How different it is when you waken to the singing of birds and lie on your cot, still half-asleep, smilingly listening to the northern yellowthroat's "wichety-witch" or a vireo's gentle warbling.

The tanager's "chirp-burr" is accompanied by a flash of red in the treetops in the area where yesterday you spied his greenish yellow mate on her shallow nest high up in a big oak. Are they the same pair, you wonder lazily, that nested here last year? How amusing the young male tanager looked last fall, splotched with green, yellow and red patches, like a jester's suit!

You feel an urge to join the birds in their enjoyment of the early morning sunshine — to visit the shrub where a small nest is neatly woven into a horizontal fork of twigs only a few feet from the ground in typical red-eyed vireo fashion. How dainty the young birds will be with their fluffy white breasts and olive-green backs and wings!

You hope no tragedy will befall the white, slightly speckled eggs now resting in that cradle nest, such as befell the neighboring redstart family — although the redstarts do not seem to recognize the tragedy. They were victims of the cowbird. In the redstart's small nest 10 or 12 feet up in the crotch of a small tree, the cowbird, which never builds a nest nor raises her own young, laid a brown-speckled whitish egg, considerably larger than the redstart's own. Some birds seem to recognize such danger and meet it in various ways such as building a platform over the eggs and starting to lay again, or by removing the cowbird egg from the nest. But in this case neither the male redstart, that lively little orange and black "torch-bearer," nor his olive and yellow mate evicted the cowbird's egg. Consequently the bigger and faster-growing cowbird either starved the little redstarts or crowded them out of their rightful nest, so that it alone survived. Since a full-grown cowbird is almost twice the size of a redstart, the youngster soon surpassed its patient foster parents in size and demanded their unceasing efforts to appease its appetite. Only recently we saw the gaily colored male redstart busily flitting about, laboring to feed the much larger cowbird, which with loud cries, gaping mouth and fluttering wings kept up its incessant demand for more and more food.

As you lie musing, a chorus of "tseep-tseep" from the trees overhead brings to mind the cedar waxwings (perhaps our favorite bird neighbors) — those gentle, crested birds with yellow tailband and red-tipped wings that often descend in flocks upon the blueberry or mulberry bushes or the wild cherry tree. Perhaps this year the flock includes the four that you watched grow last summer, and that gently took bits of berry from your



Photograph by Allen D. Cruickshank, courtesy National Audubon Society

A Redstart Feeding Its Own Young. No Vagrant Cowbird Here!

fingers. You won't recognize them, though. Their mottled baby breasts and ruffled feathers will have given way to sleek and shining brownish gray coats. Their crests will be long and perky, outlined by a dark stripe through the eye. But it is pleasant to lie on your cot of an early morning and imagine that the birds chattering in the near-by trees are those that alighted on your hand a year ago, and that your bird neighbors remember and return.

You may have heard another kind of singing in late summer — that of the cicada or harvest fly. This music is, of course, not produced from the throat but by muscular vibration of membranes at the base of the abdomen. It is only the male that sings, which led an ancient poet to write,

> Happy are the Cicadas' lives
> Because they all have voiceless wives.

But, although familiar with the singing, would you recognize the singer?

While lunching on the trail one day we noticed a small object hanging from a projecting bit of bark on a near-by tree. On closer examination we found it to be an insect, delicate pale green with beady black eyes, its transparent, greenish-veined wings folded back over a rusty tan body. It clung firmly to the larval shell case from which it had recently emerged. This was the beginning of the third and final stage of the cicada's life that started when eggs were laid in the split stems of young twigs. From the eggs, white grubs or larvae hatched, soon dropped to the ground and burrowed beneath the surface, where they fed on plant roots for about two years.

One fine day in August this larva emerged from the ground, crawled a few feet up a tree trunk and hooked its feet firmly to the bark. Its outer skin dried, split lengthwise down the back, and from it crawled the winged insect that sings.

For several hours the cicada hung on the bark, while its wings slowly expanded

and hardened. We could not tarry to watch the whole process as its delicate colorings gradually turned to black and darker green, but in a few hours the mature insect with prominent eyes and clear, veined wings was no doubt ready to fly away and begin the life cycle all over again.

The skunk is one of our best-behaved neighbors of the wild. He minds his own business diligently; and so long as we mind ours, we get along very well. The skunk, like the rattlesnake, has a poor reputation, but both are nonaggressive, act only on the defensive, and then with advance warning. A skunk will amble off deliberately in his own good time if given the opportunity. He eats his weight several times a week in harmful worms and insects such as army worms, potato bugs, tomato worms and grasshoppers.

Photograph by T. Llyle Keith

A Cicada, Just Emerged from Its Larval Case

The skunk we came to know best was a young one, probably not long independent. The preceding spring he had no doubt been one of several black and white striped little ones which followed their mother, single file with tails erect, along their woodland paths. Now he lived in a burrow just over the knoll from our lean-to and seemed to consider himself caretaker of our camping area. Every evening he patrolled the space around our table and fireplace, back and forth systematically, nose to ground, apparently scavenging the crumbs and small bits of food that had been dropped.

In late afternoon this particular skunk would sometimes appear, ambling over the knoll, and partake of food we tossed him. He seemed to depend on smell rather than sight to find these tidbits, for he would often pass by within a few inches and when a foot or two beyond, would suddenly wheel and go directly to the food. My husband was in the area when *Mephitis* appeared early one evening. He stood stock still and the skunk several times walked between his legs, paying no more attention than as if they were attached to the table. Skunks differ somewhat in their dispositions, even as you and I, but mostly they are complacent and continue their unhurried way while other animals, even bears, step aside rather than dispute the right-of-way.

No skunk has ever paid our tent or lean-to a nocturnal visit, but I am sure that if one ever does, we shall not interfere but shall follow the example of the Indian whom Ernest Thompson Seton quotes as saying, "We have heap Skunks. He come in tepee much in night, we keep quiet, let him alone. He fill him belly and go peaceful, go good. No trouble. We think it better that way."

Plants of Ancient Lineage

An Appeal To Protect the Clubmosses from Commercial Use

MABEL H. JAMES
Chairman, Conservation Forum of New York State

SOME 350 MILLION YEARS AGO, we are told, the first land plants began the process of transforming barren land masses from a dreary wasteland of rock and rock fragments to the green forest world which we blithely take for granted today. From infinitely small beginnings land plants thrived and spread until in the Coal Age or Carboniferous Period (from perhaps 280 down to 220 million years ago) huge ferns, horsetails and clubmosses reached the dimensions of modern trees. By their successive growth, inundation and new growth, they laid down the seams of coal upon which present-day civilization so heavily depends for heat, light and power. Through their work the sun's energy of those far distant days was captured and stored and made available for our use today.

There were no oaks or maples, no pines or hemlocks in the carboniferous jungles. Instead of these now familiar seed plants there was a host of spore-bearing plants. So numerous were spores in the jungle that from deposits of spores alone was produced the cannel coal that burns freely in our grates. The coal beds also display abundant evidence of the larger portions of the plants, trunks, leaves and roots. Though dominant in those days, the spore bearers later receded in importance and in size while the seed bearers increased and became dominant.

We are fortunate that it is not alone through fossils in the coal beds that we may study spore plants. Ferns, clubmosses and horsetails, small indeed as compared with those of the far past, exist today in their chosen environments and add their extraordinary charm, sometimes in lavish abundance, to many a country roadside and woodland.

Today's clubmosses (*Lycopodiums*), less conspicuous than the larger ferns, or the horsetails (*Equisetums*), rise only a few inches from the ground and, when pulled, show but a meager root system. But with dwindling of their size through the ages there has been no corresponding diminution of their beauty. Variously called Christmas greens, ground pine, ground cedar, running evergreens or "prince's pine" (this name properly belongs to pipsissewa, a charming seed plant) and by many other names, clubmosses are annually gathered to decorate homes, churches and stores for the holiday season. Of the several species that grow in New York State the trailing and the treelike forms are most often so used. Trailing clubmoss (*Lycopodium complanatum*, var. *flabelliforme*) forms a forest ground cover of special charm that sometimes persists in the open for years after cutting away of the woods.

Treelike clubmoss (*L. obscurum*) is also sought for decorative use. Its greatest beauty, however, vanishes with its fresh greenness. Commercial users therefore have learned to dry it and dye

it with artificial color, with resulting extensive use by department store and other buyers. In this condition it does not appeal to those who know it in its natural haunts.

Other species, less used for decorations, are the shining (*L. lucidulum*), stiff (*L. annotinum*) and common (*L. clavatum*) clubmosses, all widely found in suitable locations in the State. Still others are less frequent in occurrence. Each provides a matchless beauty of its own and each serves to hold forest leaves where they fall and aids their use in soil building. Each makes its constant and definite contribution to the enrichment of the earth which only the green growing plants can accomplish and by which they bridge the way to life for all the animal kingdom.

Botanists, ecologists, naturalists and conservationists look upon the charm of these lowly plants with deep appreciation of their beauty and significance. Their voices have frequently been raised in a plea that such wildings be gathered only sparingly, that their contribution to the forest economy be recognized and that their commercial exploitation be outlawed. They point out that equally beautiful and more lasting Christmas decorations can be fashioned from the abundant pine and balsam; that for outdoor use spruce and hemlock, the leaves of which dry out too readily indoors, are entirely satisfactory. In fact, no material can provide greater yuletide beauty than the familiar hemlock. For roping, arborvitae is successfully used both indoors and outdoors. Foresters assure us that the harvesting of Christmas trees

Photograph courtesy of Yale Peabody Museum

A Landscape in the Carboniferous Age, Showing Trees Ancestral to Present-Day Clubmosses

Photograph by Helen G. Cruickshank, courtesy National Audubon Society

Running Pine Clubmoss in Fruiting Stage Growing with Haircrop Moss

and the pruned lower branches of plantation conifers is merely a part of good forest practice.

Who, then, wishes to continue the commercial use of clubmosses? Apparently only those whose habit it is to invade the property of others, usually in isolated areas, to gather them by truckloads and carloads for shipment to the cities. Many owners who are deeply concerned are usually unable to apprehend the trespassers; other owners are frequently unaware of the depredation. Chiefly concerned are those who know of the exceeding slowness of growth of clubmosses, of the ease with which every vestige may be stripped from a wood lot, and of the difficulty of re-establishment after stripping.

Outdoor education and camping are increasing; another generation of students will undoubtedly make greater educational use of the forest. Will they find there these descendants of the Coal Age plants? Or will they be told that, like the passenger pigeon, clubmosses are a vanished race? The decision is ours to make. We can follow the excellent example of the garden clubs and demonstrate the use of "conservation" Christmas materials; we can carry on a continuing educational campaign. We can go further. It is the considered judgment of conservationists that only a legal ban on buying and selling of clubmosses will serve to cut down appreciably their unwise use.

For example, the Vermont law relating to restrictions on the taking of rare plants, includes the stiff clubmoss (*Lycopodium annotinum*, var. *pungens*) and the fir clubmoss (*Lycopodium selago*) among the many native plants of which "a person shall not take in any one year, except upon lands owned or occupied by him, more than a single uprooted specimen or two cuttings of each, and then for scientific purposes only."

Accordingly the Conservation Forum of New York State has called upon officials and legislators to establish such a ban in our State. The forum hopes for state-wide support and urges appropriate action for the preservation of these beautiful and historically interesting relics of a past age in the long development of the earth's vegetation.

Sanctuary — Mecca for Thousands

From Near and Far, Groups and Individuals Come to This Teaching Sanctuary

CHARLES E. MOHR
Director
Audubon Nature Center
Greenwich, Connecticut

ONLY 30 MILES from New York City is a nature sanctuary as quiet and refreshing as the great metropolis is noisy and tiring. The Audubon Nature Center, as it is known, is located eight miles north of Greenwich, Connecticut, and an equal distance from White Plains, New York. Miles of foot paths run through its wooded glens and along its ponds and streams. Some have trail signs, informative and intriguing, that lure you on. In a trailside museum are bold, colorful murals that tie together the ideas you have accumulated in the woods.

This sanctuary is the Mecca of thousands of people each spring and fall. School classes by the score come from Westchester county and all of western Connecticut. Scout troops, Junior Audubon Clubs, garden clubs, natural history and photographic societies and other civic groups make scheduled visits.

For ten weeks each summer teachers, youth leaders and garden club members come from all parts of the country, for here the National Audubon Society conducts one of its four nature camps.

Close as this sanctuary is to the metropolitan area, it abounds in wildlife of every sort. The birds and animals that make their home on the 400-acre sanctuary are completely free and untamed. But only those who walk the trails most quietly are likely to see deer and fox. Rabbits, squirrels, chipmunks and sometimes woodchucks and skunks are less wary, and so are more often seen. Weasel, mink, raccon and 'possum leave their tracks along the brook.

"What do foxes eat?" our guide will ask the group he is conducting along the nature trail. "Chickens," someone is sure to answer. No poultry is raised on or near the sanctuary, however, so the Audubon foxes certainly eat no chickens. A trail sign pictures a red fox and gives the answer:

> "Foxes eat fruits in summer, mice and rabbits in winter, insects in the fall; rarely, birds. Look for the scats along the trail, often on rocks. They reveal the foxes' diet."

Most persons are surprised to learn that so much can be discovered about the food habits of an animal simply by examining the droppings or scats.

On the sanctuary, as elsewhere in fields and woods, there is a host of mice, moles and shrews. These small mammals are eaten not only by the red and gray foxes but by hawks and owls, crows, snakes, weasels, and by the wildcat which is the sanctuary's rarest mammal. Each kind of mammal is recognized as having a rightful place in the wildlife community and so receives full protection.

But the mammals and the birds are abundant not simply because they are protected. Of greater importance to wildlife is an adequate supply of food, and sufficient suitable shelter or cover. There

must be enough of each, not only during the hectic days when the ravenous young must be fed but also for the critical days when winter comes.

All wildlife runs the gauntlet of accidental injury, disease, starvation, freezing and predation. Only where the environment is most favorable will enough individuals survive these many hazards to insure the maintenance of the species. One of the major objectives of any sanctuary is to improve the environment — to increase its "carrying capacity" for bird and animal life.

It is our wish to have our visitors and students see as many different kinds of wildlife as possible. Fortunately, virtually every type of environment or habitat can be found at the Audubon Nature Center: pond, swamp, stream, orchard, field, thicket and young and mature forest. Each habitat is large enough to support a typical wildlife population.

Careful censuses of the birds in our mature deciduous forest, for example, demonstrate what woodland nesting birds students may expect to find in similar situations. Wood thrush, veery, red-eyed vireo, ovenbird and black and white warbler are most numerous. Hairy, downy and pileated woodpeckers and a scattering of other species also nest here.

To many persons the variety of birds that live in the woods would seem surprisingly small. This is because the food and cover is suitable only for certain types of birds. But where fire or storm or the woodsman's ax have removed the forest, underbrush is soon established. Here the great variety of berries and seed-bearing shrubs, young trees, grasses and weeds and the insects that feed on them prove attractive to many more kinds of birds.

It is in the shrub-invaded, overgrown fields, unfarmed for eight to ten years, that the chats and white-eyed vireos, towhees and cuckoos and a great many warblers find the food and nesting sites they need. Here we find the greatest concentration of bird life. Indeed, without these brushy areas we would be far from reaching the total of 87 nesting species for the sanctuary.

While our sanctuary contains many types of habitats, we are fully aware that they are not static. In time the bare glacial rock, the open pond or the cultivated field will be transformed. Eventually forest may cover all of them, but hundreds of years may be required.

To record these gradual, almost imperceptible changes, the Nature Center staff has mapped the plant life acre by acre, and plans to resurvey each acre at regular intervals. Nesting sites of birds and dens of animals are located on the maps. Over a long period the maps for any one acre will form a virtual slow-motion picture of its changing character, and furnish the explanation and an accurate record of the rate of change in its plant and animal life.

It is possible for the students in our summer classes or other persons frequently visiting the center to identify every stage in the transformation of an area from glacial stage to climax forest.

Following our trails, for instance, a student can observe how swamps fill up into grassy meadows, and its marsh inhabitants are gradually replaced by meadow larks, grasshopper sparrows and meadow mice. Next he can see how the grassy meadows are slowly invaded by shrubs, and now become the home for bobolinks, Henslow's sparrows and cottontails. Farther along he may see an area that shows how the shrubs become thicker, the constantly increasing topsoil begins to support a few young trees — and then the environment leads to the establishment of still another new bird and animal community, with yellow-

throat, song and field sparrows and woodchucks moving in.

Eventually, as the climax forest matures and there is a permanent, solid canopy of leaves or branches above, and a stabilized ground cover below, the area becomes suitable housing for the red-eyed vireos, ovenbirds, white-footed mice, chipmunks, gray squirrels and larger animals. The original meadow larks and other successive tenants will have long since been dispossessed or will have moved away to another area that still offers the type of accommodations they prefer.

An understanding of this orderly succession forms a useful background for appreciating the interrelationship of soil and water, plants and wildlife. Firsthand experience with our renewable natural resources is provided for teachers, youth leaders and others who attend the two-week conservation courses.

A visit is made to near-by Kensico Reservoir, which daily supplies New York City with three-quarters of a billion gallons of water. A run-down farm, revitalized by soil conservation practices, offers a climax to personal discoveries in soil make-up and the factors that affect erosion. On the spot studies of aquatic resources take the campers into a lake and into Long Island sound.

Each experience is translated into the individual's own classroom or community situation. Many of the teachers are sent by a local garden club, Audubon Society or other conservation group. Ofttimes they return with a "blueprint" for a new unit of study or for some community conservation project.

The center's ultramodern trailside museum has a remarkable series of interpretive exhibits. Many of them can be manipulated by the visitor, and some are

Photograph by Charles E. Mohr, courtesy National Audubon Society

A Conservation Class Studying the Ecology of a Maple Swamp

of types that could be reproduced in the average classroom. As enthusiastic advocates of sensory education of all types, the staff uses the latest films, transcriptions, filmstrips and color slides as part of its teaching technic.

The wildlife sanctuary portion of the Nature Center was donated to the National Audubon Society by Mr and Mrs H. Hall Clovis in 1942, and was opened to the public late in 1943. Besides its exceptional bird and animal population, it possesses a notable variety of attractive flowering plants and trees in their natural state — fringed gentians, mountain laurel, azalea, dogwood, lady's-slippers, tulip tree, tupelo or sour gum, bayberry and bittersweet.

In 1945, however, the society also acquired from its trustees the so-called Fairchild Connecticut Garden, just a short distance south of the wildlife sanctuary, and made it an integral part of the Nature Center. This 130-acre natural garden now outshines the wildlife sanctuary in plant life.

To the Audubon Center come naturalists and civic leaders from many parts of the United States and from foreign countries, to see a teaching sanctuary which they hope will be duplicated many times, to bring a more widespread appreciation of man's interdependence with his environment and a clear understanding that conservation means wise use of our natural resources.

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Some Mice of Field and Wood

More Information Is Needed on the Contribution of Small Animals to Nature's Economy

WILLIAM J. HAMILTON JR
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Cornell University

A TEEMING WORLD of little animals, seldom seen and little known to most of us, pass their obscure lives in the fields and woodlands of New York State. These furred sprites are rarely observed, for they either pass the daylight hours in slumber or seek the canopy of field grasses and shallow burrows beneath the forest floor. In spite of their retiring ways, these little mammals are often incredibly abundant, far outnumbering the conspicuous birds that live overhead. Their lives are just as interesting, and what we have learned of their habits suggests the very important role they play in the economy of nature.

New York can boast about a dozen common species of these little mammals. None is more widespread and abundant than the field mouse or meadow mouse, occurring from the salt marshes of Long Island to the forested slopes of the Adirondack peaks. Small beadlike eyes, short ears hidden in the fur, coarse grizzled fur and a gray belly serve to distinguish this abundant species. The

little nest of dried grass, scarcely larger than a grapefruit, serves both as a sleeping chamber and a nursery. Here the young are born, one litter succeeding another from early spring until the fall frosts proclaim the approach of winter. The cold months hold no terror for these rodents — the retreating snows of March reveal evidence of their winter activity. The gnawed bark of fruit trees, the blanched stalks of orchard grass and the prominent trails through the flattened weeds are tangible evidence of mouse activity beneath the snow. This mouse is the favorite of hawks, owls, weasels, foxes and other predatory species, abundantly evidenced by stomach analyses of these animals.

The deer mouse, often called the white-footed or wood mouse, is a dainty little creature, its fawn-colored upperparts contrasting sharply with the cotton-white feet and belly. Great bulging black eyes, prominent ears and a tail as long as the body help to distinguish this little beauty. The deer mouse often enters homes in rural areas, particularly during the colder months, where it takes up an abode in the wall, pilfering the precious stock of stored hickories or other nuts. Often the first intimation of its presence will be a nut-filled boot, long unused, in some recess of the basement. These little rodents often utilize a deserted woodpecker hole, a birdhouse or actually cap over a long-deserted robin or catbird nest by doming the top with dead leaves and thistledown. Startle the nursing female from such a retreat and she scampers off, the four or five young clinging tightly to her breasts. In the hedgerows, one often finds nests which have acted as a dinner table, the little pits of wild cherries neatly opened for the meaty germ within. Fruits, berries, beetles, caterpillars and other woodland delicacies serve them through the summer. Deer mice laboriously gather nuts and seeds of various plants for the long winter period. They make no pretense at hibernation, as their elfin tracks in the fresh snow attest.

Yet another midget of the forest, less seldom seen, is the red-backed mouse. Its chestnut coat blends admirably into the dead leaves of the forest floor. Unlike the deer mouse, which is strictly nocturnal, this little fellow is up and about at all hours. It gathers the beechnuts for winter use and nibbles on the partridgeberry and various fungi as it threads over the mossy logs and loose soil. It is a woodland species and is one of our commoner small mammals of the higher Adirondacks and Catskills, although occasionally occurring in sphagnum swamps well removed from the higher altitudes.

Finally, there are the handsome jumping or kangaroo mice, with tremendous hind feet and a whiplike, almost naked tail which greatly exceeds the head and body in length. The meadow jumping mouse is a denizen of the swamps and hayfields or the open clearings of grass and shrubs bordering the woods. The larger, more brightly colored woodland jumper has a white tail tip that is a useful field mark. This latter species makes its home in the forest, where its coat blends perfectly with its chosen habitat. These mice are capable of tremendous leaps, but are confused and readily captured if set upon by a field class. In habits, they differ in one important respect from all others of which we have spoken. Throughout the summer they are stuffing themselves with food, insuring a substantial layer of fat that will serve them well later in the season. With the first heavy frosts, these mice seek a suitable chamber below the surface, wrap themselves into a tight ball and slowly

drowse away. The head is thrust between the feet, the hind legs pulled up over the face and the tail spiralled like a watch spring beneath the body. As the torpor of hibernation settles on the body, circulation is greatly reduced, respiration appears to cease, and the animal is to all appearances dead. Jumping mice pass nearly half the year in this condition, not awakening until the bloodroot has unfolded its white flower.

There are others, considered rarities by many, but not uncommon in their chosen haunts. The lemming mouse, identified by its snip of a tail and indistinct grooves on the upper yellow incisors, is found in company with all those listed above. But one must climb the wooded trails of the higher mountains (Adirondacks and Catskills) to trap that rarity of the rock tumbles, the little rodent with saffron snout, known as the yellow-cheeked or rock vole. There are some who would much rather collect one of these creatures than shoot a deer. Several species of mole, the diminutive shrews, the various bats and a host of other animals also hold company with our small rodents.

Small mammals are studied by taking them in snap-back mouse traps or by collecting them alive in little pitfalls or homemade traps of various design. By harmlessly marking and releasing them, one can learn much of their habits and ways of life.

Why study these little beasts? The reason is not hard to understand when we learn something of their importance to man and to other animals.

Field mice frequently cause considerable damage to our fruit trees and forest plantations by girdling young trees. As individuals they may not take an appreciable toll of the growing plants in a field of alfalfa or timothy hay, but in the aggregate, where their numbers approximate many dozens to the acre, their economic status may be great. To be sure, in waste areas their presence is a blessing, for here they provide, as do the other mice, a substantial part of the food of predaceous birds and mammals, which might otherwise prey upon more desirable species, at least so far as man is concerned. All these little beasts tunnel in the soil, acting much as do earthworms

Photograph by William J. Hamilton jr

Deer Mice Have Large Ears, Black Bulging Eyes and White Underparts

in making the land more friable, by burying detritus, enriching the subsoil and allowing water to be absorbed more readily.

In recent years we have come to realize that small rodents, as well as the shrews and moles, are highly insectivorous, taking large quantities of insects at all seasons of the year. Some of the insects eaten, such as the spruce budworm, are forest pests of first importance.

A study of these abundant and widespread animals, however, needs no economic justification. Their habits and life histories have been too long overlooked. Detailed observations are essential if we are to piece together the many gaps in the ecology of our native small mammals, and the interrelationships that exist between them and other animals and plants.

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The Skin of the Earth Needs Care

The Why and How of Protecting the Life-Giving Soil

HAROLD E. KLINGAMAN
Superintendent
Bureau of Soil Conservation
New York State Conservation Department

NEW YORK STATERS are beginning to realize a very important fact: that soil, like health, must be taken care of; that the skin of the earth, like that of its inhabitants, needs cover to protect it from deteriorating effects of the elements. It behooves us to guard well this soil, for it furnishes us with our food, clothing, lumber, practically everything we use in present-day living.

A century ago, man cut the virgin timber from New York hillsides and placed the land under cultivation and grazing. He found six to eight inches of pure topsoil that, rich in organic matter, produced bountiful crops. The handiest system of land subdivision for these, our ancestors, was one in which farms were laid out in squares, thus making it easy to plow, plant and cultivate crops parallel to the roads and fences. Of course these convenient straight lines took no account of the slope of the land, and consequently many of the crops were planted in rows that ran up and down the hills. Here was an invitation to erosion — a process that speedily ensued. And year after year the system persisted; year after year the sloping fields were cropped, and every rain that fell carried away a little bit more of the valuable topsoil. That which remained became increasingly less productive. Water, which could have been stored in the porous topsoil against a perilous dry spell, found little vegetation to soften its insistent hammering at the earth on the hills, dug deeper and deeper into every channeled hump of land, carried additional soil with it, caused floods in the valley. Trouble, big trouble, was begun, and its name was EROSION.

In New York State, this trouble follows two rather definite patterns: (1) water erosion (2) wind erosion.

Water erosion, costlier and more prevalent of the two, may be classified as sheet erosion and gully erosion. Sheet erosion occurs during a heavy rain when the water runs over a sloping field in "sheets," carrying a layer of fine soil from the *entire surface*. The sheet of water gradually runs toward depressions in the land and causes small gullies, or channels, to form in the field. Then the field is plowed or cultivated, and the insignificant little paths, footsteps of erosion, disappear. But the damage has been done. This soil washed off the land, like water over the dam, is irrecoverable, our most valuable heritage gone down to the sea, never to return.

Photograph courtesy of Soil Conservation Service

In One Rainstorm, 5/8 of an Inch of Topsoil Was Lost by Sheet Erosion

Gully erosion may be a little more noticeable, especially if a horse steps in and breaks a leg. It cuts down on the immediately available square yards of land for planting purposes. We can *see* it at work. Wherever a natural channel for land drainage is allowed to become devegetated, gully erosion is apt to follow and wear itself a quick streambed through the topsoil. As more water flows down this bed, its cutting power increases. And as this happens, more soil crumbles away and disappears, and the gully grows wider and deeper until it gets down to bedrock or back across the land of a neighbor, who may have sense enough to cover it with vegetation and stop it. Gully erosion has ruined countless acres of land in the south where tobacco and cotton crops cleaned the surface, inviting gullies. But New York State is not without its similar problems.

A survey made here in 1936 points up the serious nature of the erosion problem. It was found that more than nine million acres of land had lost from one-fourth to three-fourths of the topsoil through water erosion. Almost 700,000 acres had lost over three-fourths of the topsoil. Gully erosion, while not especially serious in New York State, has destroyed nearly 6000 acres; another 50,000 will be lost unless remedial measures are taken, and soon.

Wind erosion, which takes place on sandy acres and on most lands that are not protected by vegetation, has affected more than 900,000 acres of the Empire State with damage range from severe (450,000 acres) to complete destruction (26,000 acres).

The erosion process, far from being confined to cultivated land, may be serious on pastures which are overgrazed or improperly managed, may occur in woodlands that are grazed by livestock, may in fact take place anywhere. It can be controlled only by treating the land according to its needs and using it according to its capabilities.

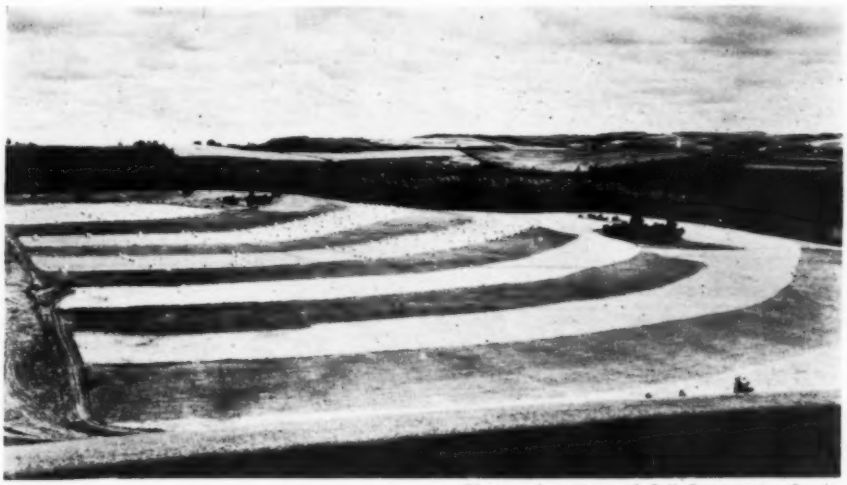
The practice of conserving soil is not new in this country. A few of the early

settlers and statesmen such as George Washington and Thomas Jefferson recognized the problem and practised soil conservation methods on their own land the best way they knew. Most farmers did not look on erosion as a problem, however, because there was plenty of virgin land uncleared of timber, unbroken by plow. But that was yesterday. Today all our good land is settled and very little of agricultural value is left to be reclaimed. This is especially important in view of increasing population and subsequent demands on our stores of food and fiber. Such realizations should make us more alert to take care of the productive land that is left.

In 1928 the Federal Government, recognizing the seriousness of the erosion process, set up several erosion experiment stations to determine (1) the rate of loss of soil under various conditions and (2) methods that could be used to prevent further loss. Research technics were developed, involving demonstration areas to show farmers that erosion losses could be stopped if certain soil conservation measures were used. Then came what we have today — the soil conservation district.

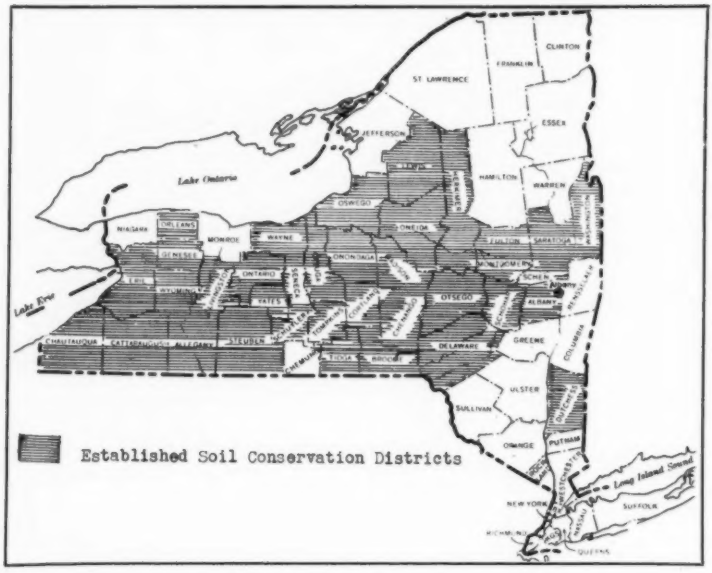
In 1940 the New York Legislature enacted the Soil Conservation Districts Law. This law declared the policy of the State of New York: to provide for the conservation of the soil and soil resources of the State, and for the control and prevention of soil erosion. This is the way it works: The county board of supervisors determines whether or not the county in question is in need of a "soil conservation district" to help solve its erosion problems. Then, having so determined, it declares the county a district and appoints a board of directors consisting of five farmer members to operate the Soil Conservation District.

Thirty-six of the agricultural counties have organized soil conservation districts since this law was enacted. The board of directors of each district prepares a long-time program which shows what the district's problems are in land use, soil



Photograph courtesy of Soil Conservation Service

Contour Strip Cropping near Avoca for Erosion Control



and water conservation — and how they can be solved. With this accomplished, the board then prepares a " work plan " which shows what, where, when, how and by whom the work is to be done.

After a soil conservation district is organized, the board of directors may call on any federal, state or local agency for assistance in carrying out its program. In New York most of the directors have obtained help from the following agencies: U. S. Soil Conservation Service, State Conservation Department, State Extension Service, town and county highway departments and other local agencies.

The Extension Service, through the county agricultural agents, carries on the educational program in districts. Through local publications, direct mail and personal contact, it brings to the attention of farmers the seriousness of erosion problems and information about available assistance in the district.

The town and county highway departments rent heavy equipment and operators to districts, which in turn make it available for use on farms under guidance of district directors.

The State Conservation Department cooperates with the districts by making the services of district foresters available to carry out the forestry phases of the soil conservation program. In addition, under Pittman-Robertson Act assistance, district game managers assist in carrying out the wildlife programs by giving technical assistance and furnishing some material such as trees, shrubs, posts and wire. Labor is made available through the Pittman-Robertson program to help establish wildlife conservation practices on the land.

The Soil Conservation Service of the Department of Agriculture furnishes the districts, when requested, with technical assistance, soil mappers, farm planners and engineers.

When a district receives from a farmer a request for assistance, the " farm planner " makes a complete soil conservation

plan for the applicant's entire farm. The planner is armed with a soils map, previously made by the soils technician. This inventories soil conditions, indicates types of soil, degree of slope, cover and approximate amount of past erosion. This conservation plan sets forth what is necessary on the farm to control erosion and still maintain an economic farm unit. It also shows the land use changes, soil conservation measures and recommended means to be used in accomplishing the job.

Two of these means we shall call "vegetative" and "mechanical." In many instances one depends on the installation of the other. Some of the vegetative controls consist of better and longer crop rotations, improvement of vegetative cover through fertilization and new and improved varieties of grasses and legumes. Trees and shrubs used for reforestation and wildlife cover are other types of vegetative controls. Mechanical controls are those in which it is necessary to use some type of machinery or tools to install the measures on the land. These may consist of contour strip cropping, diversion ditches, farm ponds, outlets and water courses, drainage and marsh development.

The first soil conservation district was organized in 1940. Several of the districts, comparatively new, are just starting their program. Those that are in operation have received more than 20,000 requests for conservation plans on 2,700,000 acres of land. To date 9200 farm plans have been made by district technicians covering 1,278,000 acres.

The table below will give an idea of the major practices used in soil conservation districts. The amount of each practice needed, planned and established to date is listed. These figures have been made available by the Soil Conservation Service through its work with districts in New York State.

The wide discrepancy between our needs and what we have accomplished points to a situation that dramatically appeals for correction. It is evident that government agencies can not do the job alone; the people themselves must help. Everyone in the State has a stake in conservation because we are all dependent on the soil for life itself. Especially is it important that our young people understand the need for conservation of our soil so that they will avoid the mistakes we have made in the past. And they must understand the problem for what it is: one that demands continuous attention because erosion is always at work.

Conservation Practice	*Needed*	*Planned*	*Established*
Contour farming, acres	4 351 000	212 011	65 675
Strip cropping, acres	4 842 000	199 096	49 513
Tree planting, acres	782 000	52 839	16 475
Fencing woodland, acres	853 000	161 867	59 465
Farm ponds, number	36 000	1 856	1 213
Diversion ditches, miles	6 000	1 678	825
Drainage, miles	966 000	2 218	1 385
Outlets and water courses, miles	5 000	995	664
Wildlife borders, acres	28 000	2 651	659

Trees for the People of New York

State Nursery Stock Is Available for Planting on Private and Public Lands

ARTHUR F. AMADON
Superintendent of Tree Nurseries
New York State Conservation Department

WHEN THE LEAVES of the white oak tree are the size of the ears of a mouse is the time to plant corn." So ran an old saying among the Indians along the Mohawk valley. This saying can be applied to tree planting throughout New York State.

At about that time this spring approximately 17 million trees will have been shipped from the New York State nurseries to more than 5000 farmers and other landowners, and thousands of persons will have started the young seedlings on their way to become a part of the future timber supply of this State. Not every tree will live, nor should more than one-quarter to one-third of the trees that survive the first year reach large size, because proper management requires that only slightly more than 200 trees to the acre may be left in a plantation after several thinning operations. These become the crop trees that will eventually be harvested as merchantable timber.

It was just prior to 1900 that tree nurseries were first established in New York State to grow stock for reforesting waste lands. The New York State College of Forestry, then located at Cornell University, operated a nursery at Axton, near Saranac Inn in the Adirondacks, from 1899 to 1902 and produced a few million trees, a large production figure for the forestry school in those days. The trees grown at this nursery were planted on surrounding areas. The state nurseries, under the Forest, Fish and Game Commission, first started to propagate trees in the Adirondack region at Saranac Inn in 1902, when a nursery was established there primarily to grow trees for planting on State Forest Preserve lands in the Saranac area, so badly burned over that little or no forest growth remained.

Approximately 50,000 acres of Forest Preserve lands in the Adirondacks and Catskills were reforested, from 1903 through 1928, with 50 million trees of several species such as white, Scotch and red pine; white, Norway and red spruce; balsam fir, cedar and European larch. There are small tracts of Forest Preserve lands still unplanted, due either to questionable land titles or to open areas set aside for the use of wildlife. During this same period more than 110 million trees were grown for use on private and municipal lands.

It was not until 1908 that an attempt was made to interest private landowners or municipalities in the tree-planting movement. In 1909, five individuals and one municipality (Gloversville) purchased 25,000 trees, whereas for the spring of 1949 more than 5000 persons have ordered 17 million trees. This apparently large number of trees will reforest only 17,000 acres of waste land. When it is realized that there are several million acres of submarginal or abandoned farm lands in New York State

that are, or eventually will be, out of production and should be planted to trees, it is apparent how slowly the reforesting movement actually has progressed.

State land planting since 1928 has been confined to the so-called "reforestation areas," which are areas of submarginal lands purchased by the State for the establishment of "production forests" outside of the Forest Preserve. Plantations established on these areas can be lumbered in the future, whereas the State Constitution prohibits lumbering on state lands in the Forest Preserve.

At the end of 1948 a total of 682,000,000 trees had been distributed from state nurseries: 362,000,000 to state lands and 320,000,000 to private lands. The size of private land plantings has ranged from 1000 trees, or enough to reforest one acre of land, to over 5½ million trees on a single plantation project. Municipalities have planted 82,600,000 trees. Oneida county leads all others, having planted 5,532,000 trees to date.

In 1936 — the high point — a total of 72 million trees were distributed from the six state nurseries. Distribution dropped to 4 million trees in 1945, due to the reduction of funds for the reforestation area project during the depression years and the World War.

Where there were six nurseries in operation in 1936, there are now two — one at Saratoga and the other at Lowville. At these two nurseries it will be possible to maintain an annual production of from 45 to 50 million trees after the present nursery extension program is completed in 1950. The seeding program in 1948 and the contemplated program in 1949 are planned for an annual production of 34 million trees. The program of tree production for private land use was increased by 12 million trees last year. This increase doubles the production goal of trees for private plantings for which seed was sown in 1947. The trees from this accelerated seed sowing will be available for landowners in 1951. As the demand for tree stock increases, production can be increased to a total of from 45 to 50 million trees a year.

The propagation of trees is a highly technical operation, from the time that the seed is secured and sown in the beds until the trees are lifted from the seedbeds and crated for shipment. One of the most interesting as well as most perplexing nursery problems is the procurement of tree seed. There are not more than a half-dozen dealers in the country who have on hand an appreciable amount of seed of any one species or who can obtain seed in large amounts. There has been no stabilized tree seed market since the start of the late war.

Some of the more important species of seed come from outside the United States. Norway spruce and Scotch pine come from Germany, European larch from Switzerland and central Europe, and Japanese larch from Japan. The unstable economy of all these countries since 1942 has been reflected in the tree seed as well as other commodity markets. The tree species mentioned above are native to those countries and have not been propagated in America long enough nor in large enough quantities to furnish the amount of seed required here.

The seed market has always been a very competitive one, since not only the Federal Government but 12 or 15 northern and central states need more seed than actually exists on the market. There is also competition from other countries such as England, Germany and Denmark which demand large quantities of seed for their enlarged reforestation programs. The New York State nurseries used 3500 pounds of seed in 1948 and will sow

Photograph courtesy of New York State Conservation Department

Red Pine Plantation on Abandoned Farm Land, Saratoga County

more than 4000 pounds this spring. It is easy to see, therefore, why the seed problem takes precedence over all others in the production of trees.

The seed of white and red pine and white spruce is collected in the Adirondack area and from the plantations on the reforestation areas. "Seed orchards" have been established on these state areas and cones are collected in years of bumper cone crops. Not all coniferous trees bear seeds each year. White pine trees produce large amounts of cones once every two or three years and red pine once in six years. From these cones the State extracts the seed in a modern seed extraction plant and stores the surplus for several years in an underground vault at low temperatures of about 36° F. In this way there is always some seed available for use in years when there is a lean seed crop.

Probably the most outstanding development in nursery practice in the past 40 years has been the mechanization of the different nursery operations. Just as in agriculture, this has resulted from the shortage of labor. Without mechanization, the state nurseries could not have functioned in propagating the 70 million trees which is the inventory at the Saratoga and Lowville nurseries. Machinery now being used in the New York State nurseries includes seedbed formers, which are hauled by tractor over cultivated areas and "lay up" and completely form the seedbeds, four feet wide and several hundred feet long; automotive sanders to cover and roll seed into the beds; automotive tree lifters, which in combination with a two-row potato digger, remove the trees from the beds; and automatic sorting machines and bundle tiers.

Stock grown at the state nurseries is available at a nominal charge for planting on private lands, and without charge for reforesting publicly owned idle lands. They can not be distributed for use as ornamentals, nor are they of suitable size or development for that purpose. The

State does not propagate broadleaf deciduous trees or "hardwoods" because they are not considered suitable for producing a cover under average planting conditions in New York, and because they are also subject to heavy losses from drought, rabbits and field mice.

Trees sent out from the nurseries are primarily intended for the production of forest products, from Christmas trees to high-grade lumber. Other economic uses are for watershed protection purposes, soil erosion control and wildlife cover. The greater part of the open waste land of the State is in the hands of farmers, and it is of importance that each farm should be in a position to supply its own timber needs in the future. This can be accomplished by the establishment of coniferous plantations to produce building material for both repair and new construction purposes.

To procure tree planting stock for the above purposes, application should be made to the State Conservation Department at Albany, but not later than mid-December for delivery the following spring, to insure a good choice.

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A Few Films on Birds

THE FOLLOWING list of 16-millimeter sound motion pictures has been compiled by Paul T. Williams, supervisor of visual education in the Bureau of Radio and Visual Aids, with the collaboration of Walter J. Schoonmaker of the State Museum staff. This list of bird films, although not exhaustive or complete, contains some of the films that have been reviewed and found worthy of being brought to the attention of teachers, bird club enthusiasts and other interested people.

All films listed may be obtained on a rental basis. Information regarding rental charges may be obtained from the distributors. The Bureau of Radio and Visual Aids of the State Education Department does not distribute these films.

1 Red-Winged Blackbird (10 min. color)

Annual migration. Close-ups show an egg hatching in a teaspoon. Sequences of young bird's rapid growth. Under direction of Arthur A. Allen of Cornell University.

Distributor:

a Coronet Instructional Films
366 Madison avenue
New York 17, N. Y.

b Bertram Willoughby Pictures
1600 Broadway
New York 19, N. Y.

c Educational Film Library
Syracuse University
123 College place
Syracuse 10, N. Y.

2 Ruby-Throated Hummingbird (8 min. color)

Characteristics of eggs; nesting habits; feeding habits; hatching of young.

Distributor:

American Museum of Natural History
Department of Education
Central Park West at 79th street
New York 24, N. Y.

See 1 above

3 Bobolink and Blue Jay (10 min. color)

Nesting habits; rearing the young; feeding young; other typical characteristics of these two birds.

Distributor:

See first two distributors of 1 above

4 Woody Grows Up (10 min. color)

Hatching of the eggs; growth of a woodpecker.

Distributor:

a American Museum of Natural History
Department of Education
Central Park West at 79th street
New York 24, N. Y.

b Association Films
347 Madison avenue
New York 17, N. Y.

c Bertram Willoughby Pictures, Inc.
Suite 600, 1600 Broadway
New York 19, N. Y.

5 Songbirds of the North Woods (10 min.)

Authentic record of songs and cries of American birds — loon, white-throated sparrow, hermit thrush. Magnolia warbler and scarlet tanager feeding their young. Nesting scenes of woodpeckers.

Distributor:

See 4 above

6 The Bluebird (10 min. color)

Pair of bluebirds in competition with a wren and a starling for nesting site. Bird's song; feeding of the young; economic value.

Distributor:

American Museum of Natural History
Department of Education
Central Park West at 79th street
New York 24, N. Y.

7 Birds in Winter (10 min. color)

Compares the feeding habits and adaptations of woodpeckers; chickadees; nuthatches; juncos; English sparrows; cardinals, etc. Particularly directed toward younger children.

Distributor:

See 1 above

8 The Robin (10 min. color)

Life story of the robin. Spring arrival from the South; nesting; rearing young. Close-ups of nest building.

Distributor:

a American Museum of Natural History
Department of Education
Central Park West at 79th street
New York 24, N. Y.

b Visual Art Films
118 Ninth street
Pittsburgh 22, Pa.

9 The Wood Thrush (10 min. color)

Intimate life of the wood thrush in its natural habitat. Nest building; incubation; hatching; care and feeding of young.

Distributor:

Visual Art Films
118 Ninth street
Pittsburgh 22, Pa.

HUMMINGBIRD

Stained with a ruby
Liquid as light,
Creature of ecstasy
Living in flight!

Green of the summer
On shimmering wings,
Swiftest and lightest
Of all living things,
Where are the songs
Your throat never sings?

Creature of ecstasy
Living in flight,
Throat stained with ruby
And wings dipped in light!

Bright on the bee balm
Sipping the dew,
Vivid at noon
In the deep-burning blue,
Where are the songs
That were given to you?

MARY SLOANE

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